

This report is composed of three main sections. The first section deals with Roanoke River data and flow modeling; the second section concerns Albemarle Sound water-quality data recorded by a network of continuous monitors; and the third section focuses on Albemarle Sound hydrodynamic modeling. Within each section, the study area and approach are described, available data are presented and discussed, and the status of modeling efforts is given. Finally, an overview of future efforts to complete the investigation is discussed.

### Acknowledgments

This report was prepared in cooperation with the Albemarle-Pamlico Estuarine Study and the Division of Water Resources of the North Carolina Department of Environment, Health, and Natural Resources; and the U.S. Army Corps of Engineers, Wilmington District. Contents of this report do not necessarily reflect the views and policies of any of the cooperators in this study.

Some of the information on Roanoke River channel geometry was supplied by the U.S. Army Corps of Engineers, Wilmington District; Weyerhaeuser Company; and R.A. Rulifson of East Carolina University. The Corps of Engineers and Virginia Electric and Power Company provided information on planned releases from Roanoke Rapids Lake, which facilitated scheduling of field activities. S. Tedder, J. Overton, D. Reid, and J. Sauber of the North Carolina Division of Environmental Management, and M. Street and J. Hawkins of the North Carolina Division of Marine Fisheries cooperated in the design of the water-quality data-collection network. The U.S. Coast Guard, Fifth District, granted permission for use of existing channel markers to support some of the data-collection instrumentation. The Coast Guard also helped to install instrumentation at some of the sites and to recover instrumentation at downed channel markers.

## **FLOWS IN THE LOWER ROANOKE RIVER**

According to estimates by Giese and others (1985), conditions in Albemarle Sound affect flows in the Roanoke River as far upstream as Hamilton, which is about 59 mi from the mouth of the river (fig. 2). Consequently, standard stream-gaging techniques, which are based on a unique and fairly stable relation between water level (or stage) and discharge at a selected site, cannot be used to obtain a continuous record of flow rates in the Roanoke River downstream from Hamilton.

Flow models may be used to obtain continuous records of discharge at sites where standard stream-gaging techniques are not applicable. A one-dimensional, unsteady flow model is being implemented for the Roanoke River from the State Highway 11-42 bridge (near Oak City) to the State Highway 45 bridge (near the mouth of the river). In this section of the report, the study area and the modeling approach are briefly described. The streamflow data-collection network is presented and data are discussed. Finally, preliminary modeling results are given, and plans for completion of the flow model are outlined.